

1. Record Nr.	UNINA9910957277103321
Autore	Bhuyan Manabendra
Titolo	Intelligent instrumentation : principles and applications / / by Manabendra Bhuyan
Pubbl/distr/stampa	Boca Raton, FL : , : CRC Press, an imprint of Taylor and Francis, , 2010
ISBN	9781040163054 104016305X 9780429113116 0429113110 9781439895047 143989504X
Edizione	[First edition.]
Descrizione fisica	1 online resource (548 p.)
Classificazione	TEC064000TEC008000
Disciplina	681.2
Soggetti	Intelligent control systems Engineering instruments Computerized instruments Detectors
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Front cover; Contents; Preface; Acknowledgments; Author; Chapter 1. Background of Instrumentation; Chapter 2. Sensor Performance Characteristics; Chapter 3. Signals and System Dynamics; Chapter 4. Intelligent Sensors; Chapter 5. Linearization, Calibration, and Compensation; Chapter 6. Sensors with Artificial Intelligence; Chapter 7. Intelligent Sensor Standards and Protocols; Questions; Index; Back cover
Sommario/riassunto	With the advent of microprocessors and digital-processing technologies as catalyst, classical sensors capable of simple signal conditioning operations have evolved rapidly to take on higher and more specialized functions including validation, compensation, and classification. This new category of sensor expands the scope of incorporating intelligence into instrumentation systems, yet with such rapid changes, there has developed no universal standard for design,

definition, or requirement with which to unify intelligent instrumentation. Explaining the underlying design methodologies of intelligent instrumentation, *Intelligent Instrumentation: Principles and Applications* provides a comprehensive and authoritative resource on the scientific foundations from which to coordinate and advance the field. Employing a textbook-like language, this book translates methodologies to more than 80 numerical examples, and provides applications in 14 case studies for a complete and working understanding of the material. Beginning with a brief introduction to the basic concepts of process, process parameters, sensors and transducers, and classification of transducers, the book describes the performance characteristics of instrumentation and measurement systems and discusses static and dynamic characteristics, various types of sensor signals, and the concepts of signal representations, various transforms, and their operations in both static and dynamic conditions. It describes smart sensors, cogent sensors, soft sensors, self-validating sensors, VLSI sensors, temperature-compensating sensors, microcontrollers and ANN-based sensors, and indirect measurement sensors. The author examines intelligent sensor signal conditioning such as calibration, linearization, and compensation, along with a wide variety of calibration and linearization techniques using circuits, analog-to-digital converters (ADCs), microcontrollers, ANNs, and software. The final chapters highlight ANN techniques for pattern classification, recognition, prognostic diagnosis, fault detection, linearization, and calibration as well as important interfacing protocols in the wireless networking platform.
